

Nurses' Knowledge and Practice Regarding Skin Care in Neonatal Intensive Care Unit an Assessment Study

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Abstract

Background: The neonate's skin is the body's most significant protective system. Neonatal skin injuries are linked to admission to the Neonatal Intensive Care Unit(NICU). **Aim:** This study aimed to assess the nurses' knowledge and practice regarding skin care in NICU. **Design:** A descriptive design was utilised. **Subjects:** A convenient sample composed of 80 nurses who were working in the NICUs and providing care for neonates in NICUs. **Settings:** The study was conducted at NICUs at El-Fayoum University Hospital and El-Fayoum Public Hospital. **Tools of data collection:** Two tools were used as the following: 1-Pre-designed Questionnaire format to assess characteristics of the studied nurses and their knowledge regarding skin care and Braden Q Scale. 2-Observational checklists to assess nurses' practice regarding skin care such as routine skin care, ... **Results:** The findings revealed that more than one third of the studied nurses their ages are ranged from 20 < 25 years, with the mean age 25.2±1.4 years, more than two-fifth of them had 5 < 10 years of experience with the mean experience years 7.3±1, more than one-third of them had good total knowledge and more than half of them had incompetent total practice about skin care in NICU. **Conclusion:** Findings of the current study, it can be concluded that most of studied nurses had good knowledge about skin care for neonates and were incompetent in their practice regarding skin care for neonates at neonatal intensive care units. **Recommendations:** In-service training, regular educational programs or refresher courses about skin care should be developed for nurses in NICU, training of Braden Q Scale assessment and recorded schedule for nurses that working in NICU and further studies to assess the risk factors and barriers that affect on nurses' application to skin care for neonates in NICU.

Key words: Neonatal intensive care unit, Nurses' knowledge and practice and Skin care.

Introduction:

Neonatal Intensive Care Unit (NICU) is a unit specializing for critically ill newborns (NBs) requiring continuous care and supervision during the first 28 days of life. NICU environment presents numerous challenges to maintaining skin integrity, where routine care practices, including bathing, application of monitoring devices, intravenous (IV) catheter insertion and removal, tape application and exposure to potentially toxic substances disrupt the normal barrier function and predispose both premature and term newborns to skin injury (*Morton, 2016*).

The skin is the largest organ of the body and receives one-third of the body's circulation blood, protection, immunity, thermoregulation, meta-bolism, communication to many function and sensation, Neonatal skin care plays an important role as a protective and regulatory barrier between the body and the external environment, particularly for hospitalized newborns with varying degrees of underdeveloped skin structures and functions of great interest to neonatal nurses (*Stroustrup, 2018*).

Skin of the newborn differs from that of an adult in several ways. It is more susceptible to trauma and infection and requires special care, where the purpose of neonatal skin care is needed to prevent potential skin breakdown, impede the percutaneous entry of pathogens and prevent dehydration of the internal organs, also promote skin integrity, reduce trauma to the skin and promote normal skin development (*Sarkar, 2010*).

The North American Nursing Diagnosis Association (NANDA) cites the following as risk factors for the development of skin injuries, radiation, chemicals, medications, use of adhesives that remove hair, pressure, moisture, excretions, secretions, and extremes of age. The higher risks of developing skin damage and injury are prematurity, prolonged stay in NICU, low birth weight, use of monitoring equipment, endotracheal tubes and physical immobility (*Cloherty and Eichenwald, 2012 & Natalia and Raionara, 2017*).

lack of knowledge and practice in skin care contribute significantly to the occurrence of

skin problem, Increasing knowledge about skin care among nurses is not only improve the quality of skin care but also reduce hospitalization stays and physical immobilization (*Melnyk, 2011*).

Significance of the problem:

The nurses have a vital and essential role in providing direct maintaining the integrity of skin care, assess physiological status and prevent the risk of developing skin injuries during the critical period for neonates in N.I.C.U, Nurses should be knowledgeable and skillful about skin care, so the scientific literature reveals a worldwide skin breakdown incidence ranging from 3.70 to 21.60% in the NICUs, with a prevalence of 23% approximately 80% of the morbidity and mortality of newborns are related to trauma or normal skin function changes because of its functional immaturity (*Molina, 2017*). These data highlight the needs to *overcoming the possible* occurrence of skin problems especially in neonates, So it is important to carryout the current study to shed the light on nurses' knowledge and practice *regarding skin care for neonates in neonatal intensive care unit*

Aim of the work

The aim of the study was to assess the nurses' knowledge and practice regarding skin care in neonatal intensive care unit.

Research Questions

1. What are the nurses' knowledge regarding skin care for neonates in Neonatal Intensive Care Unit?
2. What are nurses' practice regarding skin care for neonates in Neonatal Intensive Care Unit?

Subject and Methods

The subject and methods of the current study discussed under the following four (4) designs:

- I. Technical Design
- II. Operational Design
- III. Administrative Design
- IV. Statistical Design

I-Technical Design:

The technical design included the research design, study setting, subjects and tools of data collection.

Research Design:

A descriptive design was used to conduct this study.

Study Setting:

The study was conducted at Neonatal Intensive Care Unit at El-Fayoum University Hospital and El-Fayoum Public Hospital.

Subject

A convenient sample composed of 80 nurses who were working at Neonatal Intensive Care Units at the previous mentioned settings and agreed to participate in the study and distributed as the following: Twenty nurses from El-Fayoum University Hospital and sixty nurses from El-Fayoum Public Hospital regardless their age, sex, years of experiences, attending training programs about skin care.

Tools of data collection

Data for this study was collected through using the following tools:

1- Predesigned Questionnaire format:

It was designed by the researcher under guidance of supervisors in simple Arabic language and it was composed of two parts:

Part I: Characteristics of the studied nurses included their age, qualifications, years of experience in N.I.C.U, and attending training courses regarding skin care for neonates in N.I.C.U.

Part II: Nurses' knowledge:-It was developed by the researcher and based on the related literature review *Anrolld & Andrews (2016)*, *Askin (2016)*, *Catherine & Quigley, (2011)*. To assess nurses' knowledge regarding skin care, which contain 8 questions of Multi Choice Questions (MCQs) and 2 questions of true & false as the following:

- Definition of skin
- Anatomical structure of skin
- Function of the skin
- Characteristics of neonatal skin

- Purpose of maintain skin integrity
- Risk factors for skin injury or damage
- Site of skin breakage in newborn
- Negative consequences of skin breakage
- Definition of skin care
- Nursing role about skin care for neonates

Part III: Braden Q Scale: -Which adapted from *Catherine & Quigley (2011)* to assess the degree of pressure ulcer risk in neonates from >38 weeks to post term to < 28 weeks which include the following elements: General physical condition, Mobility, Activity, Sensory perception, Moisture, Friction & shear forces, Nutrition status and Tissue perfusion & oxygenation and used to :

- Assess nurses' knowledge and practice regarding Braden Q Scale, where nurses' knowledge contain four questions of multi choice questions as the following:

- Definition of the Braden Q Scale
- Purpose of Braden Q Scale
- Elements for Braden Q Scale
- Degrees of high risk

❖ Scoring system:

- According to answers obtained from studied nurses, a scoring system was calculated as the following: The total number of questions was 14 questions of nurses' knowledge, where 8 questions regarding skin care of MCQs and 2 questions of true and false and 4 questions of MCQs regarding Braden Q Scale, the correct answer was scored one and the incorrect answer was scored zero. The total score of questionnaire was 14 degrees which equal 100 % and the levels of nurses' knowledge were categorized as the following:

- Good nurses' knowledge $\geq 85\%$
- Average nurses' knowledge $75\% < 85\%$
- Poor nurses' knowledge $< 75\%$

- Braden Q Scale: - Where observational checklist of nurses' practice regarding Braden Q Scale for neonates in NICU shows that the numbers (1,2,3,4) represent the scores for each element in the scale. Example: In NICU a neonate with G.A 35 weeks and he scored as the following: Slightly limited mobility (score 2), slightly limited activity (score 2), no limitation of sensory perception (score 1), very moist (score 3), problem friction and shear (score 3), adequate nutrition(score 2) and adequate tissue perfusion

&oxygenation(score 2),So the total score is 15 and this means that the degree is high risk of neonate.

- All nurses didn't assess skin condition of neonates using Braden Q Scale.

2-Observational checklists (Appendix III): It was adapted from Zhang (2020), Daniel (2019), Chizchoma (2020), Heimall (2012), Juliana (2021), Williams (2020), Allowood (2011) and Lefrak,(2013). To assess nurses' practice regarding skin care for neonates in N.I.C.U and included: Routine skin care, minimize pressure, cord care, diaper care, bathing, adhesive care, surface support, keep moving, urinary incontinence and nutrition for neonates.

❖ Scoring System

The total scores of nurses' practice were 130 degrees equal 100% of 7 procedures for nursing practice that include 12 items for routine skin care, 10 items for minimize pressure, 9 items for cord care, 17 items for diaper care, 36 items for bathing, 20 items for adhesive care and 26 items for components skin care.

Nurses'practice score was classified into (1) degree was given for done, (0) for not done.The total scores of checklists were 100% and categorized as the following:

- Competent practice $\geq 90\%$.
- Incompetent practice $< 90\%$.

II- Operational Design:

The operational design for this study consisted of three phases, namely preparatory phase, pilot study and fieldwork.

Preparatory Phase

This phase included reviewing of literature related nurses' knowledge and practice regarding skin care in Neonatal intensive care unit. This was served to develop the study tools for data collection. During this phase, the researcher also visited the previously mentioned setting. Development of the study tools was accomplished under the supervisors' guidance and experts' opinions were considered.

Validity and Reliability:

○ **Content Validity:** It was ascertained by a group of seven experts in the pediatric nursing to test its content validity by reviewing the tools clarity, relevance, comprehensives, and simplicity. Their opinions elicited regarding the format, layout, consistency, accuracy, completeness however, a minor modification was done.

○ **Reliability:** The tool was tested to ensure that an assessment tool produces stable and consistent results overtimes reliability of the study tools used Alpha Cronbach test.It was (0.93)for predesigned questionnaire formats,(0.82)for nurses' practice. This indicates a high degree of reliability for the study tools.

$$\alpha = \frac{N \cdot r}{1 + (N - 1) \cdot r}$$

N: is equal to the number of items and r- the bar is the average inter-item correlation among the items .

Ethical Consideration

Approval of the study protocol was obtained from Ethical Committee in the Faculty of Nursing at Ain Shams University before starting the study. All the collected data was used for research purpose only, also anonymity and confidentiality of the obtained data was guaranteed. The researcher clarified the aim and expected outcomes of the study to the nurses included in the study. The nurses informed that they are allowed to choose to participate or not in the study and they have the right to withdraw from the study at any time.

Pilot Study:

Pilot study was carried out on 10% of nurses (8) nurses who were working in the N.I.C.U and providing care for neonates in N.I.C.U department in previously mentioned settings throughout the period of data collection. In order to test the applicability of the constructed tools and the clarity of the included questions related to nurse role toward skin care in Neonatal intensive care unit. The pilot was also served to estimate the time needed for each subject to fill in the questions. According to the results of the pilot, omission of some items was

performed as needed. The pilot participants were included in the main study sample.

Fieldwork

To carry out the study, an approval was obtained from the medical and nursing director of Neonatal Intensive Care Unit at El-Fayoum University Hospital and El-Fayoum Public Hospital. A letter was issued to them from the Faculty of Nursing, Ain-Shams University, explaining the aim of the study in order to obtain their permission and cooperation. Data was collected actually for a period of five months started in November 2019 and ended in March 2020. The researcher was available at each study setting by rotation, 3 days per week (Tuesday, Wednesday, and Thursday) throughout the morning shift at El-Fayoum Public Hospital in NICU and 2 days per week (Sunday and Monday) throughout the morning shift at El-Fayoum University Hospital in NICU. Each nurse was individually interviewed to fulfill the questionnaire sheet, the time consumed for completion of the questionnaire ranged from 10-15 minutes. As regarding the nurses' practices, they were observed during their actual work in the shift. Time consumed for assessing procedures took 10-20 minutes according to every checklist for neonates in NICUs.

III- Administrative Design

Approval was obtained through an issued letter from the Dean of Faculty of Nursing, Ain Shams University to directors of the previously mentioned setting. The researcher then met the hospital director and explained the purpose and the methods of the data collection.

IV-Statistical Analysis

Data collected from the studied sample was revised, coded and entered using PC. Computerized data entry and statistical analysis was fulfilled using the Statistical Package for Social Sciences (SPSS) version 22. Data was presented using descriptive statistics in the form of

frequencies, percentages. Chi-square test (X^2) was used for comparisons between qualitative variables and correlation coefficient and to test correlation between variables. The confidence interval was set to 95% and the margin of error accepted was set to 5%. So, the p-value was considered significant as the following:

- P value $\leq 0.05^*$ was considered significant.
- P value $< 0.001^{**}$ was considered as highly significant.
- P value > 0.05 was considered non significant.

Results:

Table (1): Illustrates that one third (35%) of the studied nurses their ages are ranged from 20 < 25 years, while the mean age (25.2 \pm 1.4) years. Regarding qualification, more than two fifth (40%) of them have nursing diploma.

Figure (1): Reveals that more than two fifth (45%) of the studied nurses had 5 < 10 years of experience with the mean experience years (7.3 \pm 1.1).

Table (2): As observers from that (77.5%), (65%), (62.5%), (76.2%) of studied nurses had incorrect knowledge about the definition, purpose, elements and degrees of high risk of Braden Q Scale respectively.

Figure (2): Shows that more than one third (43, 7%) of the studied nurses had good total knowledge about skin care in neonatal intensive care unit.

Figure (3): Regarding nurses' total practice about skin care in neonatal intensive care unit, shows that more than half (62.5%) of the studied nurses had incompetent total practice about skin care for neonates.

Table (3): shows that there was highly statistical significant positive correlation between total practice and total knowledge when p-value was $< 0.001^{**}$.

Table (1): Distribution of the studied nurses according to their characteristic (No.=80).

Item	No.	%
<i>Age in years</i>		
<20	5	6.3
20 < 25	28	35.0
25 <30	25	31.3
≥ 30	22	27.4
<i>Mean ±SD</i>	<i>25.2±1.4</i>	
<i>Qualification</i>		
Nursing diploma	32	40.0
Technical Institute	28	35.0
Bachelor of Nursing	15	18.8
Master Degree	5	6.2

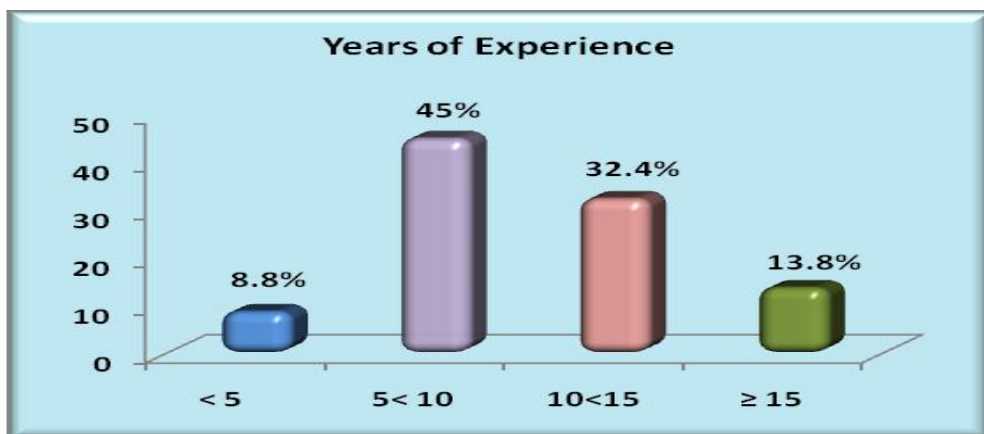


Figure (1): Percentage distribution of the studied nurses according to their years of experience (No. = 80).

Table (2): Distribution of the studied nurses according to their knowledge regarding Braden Q Scale (No. = 80).

Nurses' knowledge	Correct		Incorrect	
	No.	%	No.	%
Definition of the Braden Q Scale	18	22.5%	62	77.5%
Purpose of Braden Q Scale	28	35%	52	65%
Elements for Braden Q Scale	30	37.5%	50	62.5%
Degrees of high risk	19	23.8%	61	76.2%

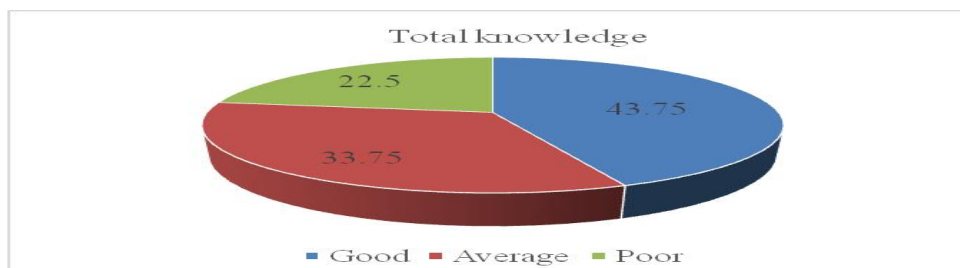


Figure (2): Percentage distribution of the studied nurses according to their total knowledge regarding to skin care for neonates in intensive care unit (No.= 80).



Figure (3): Percentage distribution of the studied nurses according to their total practice regarding skin care for neonates in neonatal intensive care unit (No. = 80).

Table (3): Correlation between total knowledge of the studied nurses and their total practice regarding skin care for neonates in neonatal intensive care unit.

Item	r	Practices	P-Value
Knowledge	0.834		<0.001**

(**) Highly statistically significant at $p < 0.001$

Discussion:

Concerning studied nurses' characteristics the present study indicated that more than one third of the studied nurses their ages were ranged from 20 to < 25 years, with mean age (25.2 ± 1.4) years (Table 1). This result was incongruence with the study conducted by *Diab (2015)*, entitled "Effect of Educational Guideline On Prevention of Skin Breakdown In Neonatal Intensive Care at Al- Jouf City" and found that most nurses were within the age of 26 to 30 years old.

According to educational qualifications, the present study showed that more than two fifth of studied nurses had nursing diploma, This result was in the same line with *Hashad (2018)* who studied "the effect of implementing a designed SKIN Care Bundle Protocol on Modifying Nurses' Practices toward (NICU), in Egypt and reported that more than two fifth of the studied nurses had a diploma in nursing.

On the other hand, less than one fifth of studied nurses had bachelor degree in nursing. This finding disagreed with *Nuru et al. (2016)* who conducted a study entitled "knowledge & practice toward prevention of skin breakdown and associated factor in Gondar university

hospital, Northwest Ethiopia" and stated that two thirds of the nurses had bachelor degree in nursing.

Regarding studied nurses' years of experience, the current study clarified that more than two fifth of the studied nurses had 5 to <10 years of experience with mean experience years 7.3 ± 1.1 (Figure 1). These results disagreed with *Etafa (2017)* who conducted a study about "assessment of nurses' knowledge and practice toward skin breakdown prevention for hospitalized newborns in intensive care unit in public hospital in Addis Ababa, Ethiopia" and found that more than two thirds of them had 10 to 14 years of working experience in the NICU.

Concerning nurses' knowledge regarding Braden Q Scale, the findings of the current study indicated that more than three quarters and more than half of studied nurses had incorrect knowledge about the definition, purpose, elements, degrees of high risk, respectively (Table 2). The findings of the current study was congruent with an Ethiopian study conducted by *Nuru et al. (2016)* who reported that, more than two thirds of the nurses did not know degrees of high risk.

Also, this finding was in the same line with the finding of a study carried by) entitled "Knowledge of Critical Care Nurses In Skin Breakdown Prevention Towards The Use of Braden Q Scale" who found that knowledge regarding Braden Q Scale was inadequate (mean score = 3.97). The researcher attributed that, to the lower level of education, which poses a higher chance for inadequate knowledge about skin risk assessment and Braden Q Scale and is the scale included training course for nurses that working in NICU.

As regarding nurses' total knowledge, the current study finding showed that more than one-third of the studied nurses had good total knowledge about skin care in neonatal intensive care unit (Figure 2). This result agreed with *Hashad (2018)*, who found that more than half of the studied nurses had good level of knowledge for neonates.

Regarding nurses' total practice about skin care in NICU, it pointed up from the present study that more than two thirds of the studied nurses had incompetent practice about skin care of neonates (Figure 3). This study finding was similar to *Fattah Hassan (2018)*, who found that most of the nurses had inadequate total practice about skin care of neonates. The researcher's point of view showed that this result might be due to other factors such as shortage of nurses, lack of time, lack of supplies and equipment which affected on nurses' practice.

The current study findings showed that there were a statistically significant differences between total knowledge and total practice of the studied nurses. It demonstrated that (table 3) there was a highly statistically significant positive correlation between total practice and total knowledge when $p\text{-value} = <0.001$

A similar result argued by *Lotfi et al. (2019)* in a study entitled "Iranian Nurses' Knowledge, Attitude and Behavior on Skin Care, Prevention And Management of Skin Injury" and found that there was a significant relationship between knowledge with educational level and attitude with work experience. Moreover, the results of *Mohamed et al. (2019)*, was in the same line with our

findings, as it demonstrated that there was appositve correlation between nurses' knowledge and practical compliance score in pre and post intervention.

As regarding correlation between nurses' knowledge and practice, our study finding was coordinated with *Hashad (2018)*, who proved that there was a significant positive correlation between nurses' knowledge and practice with a highly statistically significant difference at $p < 0.001$. Whereas the current study results were in contradiction with *Islam (2017)* in a study entitled "Nurses' Knowledge and Practice Regarding skin breakdown Prevention for Hospitalized Patients at Rajshahi Medical College Hospital in Bangladesh" and emphasized that, there was a significant negative correlation between nurses' knowledge and practice regarding skin care and skin breakdown prevention at $r =$, 14 and $p > 0.05$. This result reflected that nurses' knowledge acted as an important and independent factor in improving their practice. As well as, level of education, years of experience and formal training on skin care were significant factors for enhancing nurses' knowledge that would reflect positively on their practice.

Conclusion:

Based on the findings of the current study, it can concluded that most of studied nurses had good knowledge about skin care for neonates and were incompetent in their practice regarding skin care for neonates at neonatal intensive care units.

Recommendation:

Based upon the finding of the present study, the following recommendations can be deduced:

- In-service training, regular educational programs or refresher courses about skin care should be developed for nurses in NICU.
- Training of Braden Q Scale assessment and recorded schedule for nurses that working in NICU.
- Further studies to assess the risk factors and barriers that affect on nurses' application to skin care for neonates in NICU.

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